

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Revision of Part 15 of the Commission's)	ET Docket No. 98-153
Rules Regarding Ultra-Wideband)	
Transmission Systems)	
)	

To: The Commission

**COMMENTS OF THE
NATIONAL ASSOCIATION OF BROADCASTERS**

I. INTRODUCTION AND BACKGROUND.

The National Association of Broadcasters (NAB)¹ hereby files brief comments in response to the *Public Notice* in the above-captioned proceeding.² In January 2001, the National Telecommunications and Information Administration (NTIA) released two reports regarding the impact Ultra-Wideband (UWB) transmission technology would have on Government communications systems. UWB technology uses nanosecond duration pulses to create signals that have ultra-wide bandwidths ranging from one to 30 GHz. The FCC has proposed to authorize UWB devices under Part 15 of the

¹ NAB is a nonprofit incorporated association of radio and television stations and broadcast networks. NAB serves and represents the American broadcasting industry.

² *Public Notice, Comments Requested on Test Data Submitted by the National Telecommunications and Information Administration Regarding Potential Interference from Ultra-Wideband Transmission Systems*, ET Docket No. 98-153, rel. January 24, 2001.

Commission's Rules and allow them to operate as unlicensed devices.³ The energy from these transmissions would overlap the spectrum used by numerous radio communications services, including the radio and television broadcast bands.

The first report entitled *The Temporal and Spectral Characteristics of Ultrawideband Signals* (hereinafter *ITS Report*) was prepared by the NTIA's Institute for Telecommunication Sciences (ITS) located in Boulder, Colorado. The *ITS Report* states that its primary objective is to observe and record the temporal and spectral characteristics of various UWB signals using both highly accurate measurement methods and practical approaches with commercial off-the-shelf (COTS) test equipment.⁴ The measurements are both supported by the theoretical work and confirmed through simulation. A secondary objective of this study includes the development and description of reliable and repeatable measurement methods using COTS test equipment and the measurement of effects UWB signals have on several selected FAA radar systems.⁵

The second report is entitled *Assessment of Compatibility Between Ultrawideband Devices and Selected Federal Systems* (hereinafter *NTIA Report*). It was prepared by the NTIA's Office of Spectrum Management. The *NTIA Report* analyzed government communications systems that operate in spectrum bands from 960 MHz to 4200 MHz. Based on the data contained in the *ITS Report*, NTIA calculated the maximum permissible, average Equivalent Isotropic Radiated Power (EIRP) density in a 1 MHz

³ Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission Systems, *Notice of Proposed Rule Making*, ET Docket No. 98-153, rel. May 11, 2000, at 8.

⁴ *ITS Report* at vii.

⁵ *Id.*

bandwidth (average EIRP, dBm/MHz (RMS)) that would allow a UWB device to transmit without exceeding the protection criterion determined for each of the systems analyzed. In addition, NTIA calculated the minimum separation distances at which a UWB device with an average EIRP spectral density of -41.3 dBm/MHz (RMS) will ensure that the protection criteria are met for various types of receivers. -41.3 dBm/MHz is equivalent to the average field strength specified in Part 15 for devices operating above 1 GHz (a field strength of $500 \cdot \text{V/m}$ at a 3 meter separation distance measured in a 1 MHz bandwidth). Both the effects of a single UWB emitter and the aggregate effects of several UWB emitters on a receiver were analyzed.

The *NTIA Report* found that for almost every system tested, if a UWB device were to operate at the signal levels currently allowed under Part 15 of the Commission's Rules, it would cause interference to the tested systems.⁶ Second, under certain conditions, the interference from multiple UWB devices operating in the same general area adds linearly and can exceed the interference caused by a single UWB transmitter.⁷ Despite these concerns, NTIA concluded that operation of UWB devices may be feasible in portions of the spectrum between about 3.1 and 5.560 GHz at heights of about 2 meters with some operating constraints; however, operation below 3.1 GHz would be quite challenging.⁸ Thus, the *NTIA Report* concluded that multiple UWB devices operating outside of the 3.1 to 5.560 GHz bandwidth would cause interference to existing licensed services.

⁶ *NTIA Report* at Section 6.3.

⁷ *Id.* at Section 6.4.

⁸ *Id.* at x.

II. THE COMMISSION SHOULD ADOPT NTIA'S 3.1 GHz FLOOR AND PEAK POWER LIMITS.

NAB's concern in this matter is with protecting television and radio receivers operating in the broadcast bands,⁹ C-band satellite earth stations¹⁰ and Broadcast Auxiliary Service (BAS) stations operating in various microwave bands.¹¹ NAB is specifically concerned about the cumulative impact of the interference from those UWB devices that the *NTIA Report* characterizes as high density and high activity factors.¹² Presumably, these are the types of UWB devices that would most likely be authorized under Part 15 and thus will have the greatest potential to cause interference to the licensed radio services.

The *NTIA Report* concluded that UWB device operation may be possible between the bands 3.1 GHz to 5.560 GHz but that operation below 3.1 GHz will present challenges. NAB supports a 3.1 GHz lower band limit because it would provide interference protection for television and radio receivers operating in the broadcast bands below 1 GHz and it would provide protection to BAS stations, in particular, broadcasters' Electronic Newsgathering (ENG) systems operating in the 1.990 GHz – 2.110 GHz band. Because the cumulative affect of multiple UWB devices remains unknown in this band,

⁹ The Broadcast bands are: 535 – 1705 KHz (AM Radio); 54 – 72 MHz (TV channels 2 – 4); 76 – 88 MHz (TV channels 5 – 6); 88 – 108 MHz (FM Radio); 174 – 216 MHz (TV channels 7 – 13); 470 – 746 MHz (TV channels 14 – 59).

¹⁰ The downlink portion of the C-band satellite service operates in the 3.7 – 4.2 GHz band.

¹¹ *E.g.*, Electronic Newsgathering operations in the 1.990 – 2.110 GHz band.

¹² *See NTIA Report* at 5-34, Table 5-11.

limiting UWB operation to above 3.1 GHz would present considerably fewer risks than the Commission's original 2 GHz floor proposal.¹³

With respect to C-band Satellite earth stations, the *NTIA Report* reveals that, while there are separation distances based on the -41.3 dBm/MHz (RMS) level that would allow transmissions from an UWB device to meet these systems' interference criteria, based on the characterization of UWB devices contained in table 5-11 of the *NTIA Report*,¹⁴ it will be impossible to predict the location of UWB devices at any given time. From a practical perspective, it is illogical to presume that those devices that would be authorized under Part 15 could reasonably be expected to maintain a minimum separation distance. Thus, in lieu of separation distances, the Commission should rely on emission limits to ensure that UWB transmissions do not cause interference to receivers.

Finally, the Commission should determine interference potential based on the peak emission levels from a UWB device and not on a RMS or average EIRP basis. The *ITS Report* indicates some victim receivers will see the transmissions from a UWB devices as Gaussian in nature; in that case, the RMS value of the UWB signal would reasonably indicate the interference potential of the that device. However, another type of receiver – depending on its design – might, according the *ITS Report*, see the signal from that same UWB device as being highly impulsive.¹⁵ Thus, the RMS or average of EIRP from the UWB transmitter would not accurately characterize the interference

¹³ *Notice of Proposed Rulemaking* at 27.

¹⁴ *NTIA Report* at 5-34, Table 5-11.

¹⁵ *ITS Report* at vii.

potential of that transmitter.¹⁶ Logic dictates that, because it is impossible to predict which type of receiver will encounter a UWB transmission, the Commission should err on the side of caution and adopt a peak measurement for accessing signals from UWB devices.

III. CONCLUSION.

For the above-mentioned reasons, NAB urges the Commission to refrain from amending its Part 15 rules until technical standards and operating requirements can be established that will ensure that UWB technology will not result in harmful interference within restricted bands and television broadcast bands. At a minimum, NAB urges the Commission to adopt a 3.1 GHz lower band limit because it would minimize the risk of interference to television receivers, radio receivers and broadcasters' Electronic News-gathering (ENG) systems. Finally, the Commission should determine interference potential based on the peak emission levels from a UWB device and not on a RMS or average EIRP basis.

Respectfully submitted,

**NATIONAL ASSOCIATION
OF BROADCASTERS**

1771 N Street, NW
Washington, DC 20036
(202) 429-5430

Kelly Williams
NAB Science & Technology

Henry L. Baumann
Jack N. Goodman
Ann Zuvekas

February 23, 2001

¹⁶ *Id.* at 3-11.